As amended, all the pending claims of the subject application comply with all requirements of 35 U.S.C. Accordingly, Applicant requests examination and allowance of all pending claims.

Formal Matters

The specification has been amended so that the term "loadlock" is consistently used as a single word.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version With Markings to Show Changes Made."

The Rejections Under 35 U.S.C. 102(b)

Independent claim 1 stands rejected under 35 U.S.C. 102(b) as being anticipated by both Edwards et al. (USP 5,259,881) and Turner et al. (USP 5,512,320). Claim 1 has been canceled. Accordingly, this rejection is believed to be moot.

In place of canceled claim 1, new claim 64 has been added. New claim 64 pertains to an apparatus that includes both high pressure and low pressure deposition modules, each having a substrate transfer chamber associated therewith and a substrate handling member disposed in the respective transfer chambers. Claim 64 further requires that the high pressure deposition module include a plurality of substrate processing chambers each being dedicated to perform at least one step associated with the formation of a porous dielectric film from a liquid precursor, that the low pressure deposition module include at least one chemical vapor deposition chamber and that the apparatus include a transfer area that couples the high and low pressure deposition modules together thereby enabling substrates to be transferred between the modules.

The invention of claim 64 is particularly useful in the deposition of porous oxide films from a liquid precursor solution, such as the mesoporous oxide films described in the present application. The deposition of such mesoporous oxide films requires that a liquid precursor solution be applied (for example in a spin-on coating chamber or a spray-on coating chamber) over a substrate and then subjected to additional film formation steps such as curing, silyation and/or annealing. Each of these processes occurs at a relatively high pressure and can thus be performed in dedicated chambers that are part of the high pressure deposition module. Even after mesoporous oxide films are deposited and subjected to additional steps such as curing, silyation and/or annealing, however, such films are relatively unstable and subject to

moisture contamination. Thus, the apparatus recited in claim 64 also includes a low pressure deposition module that includes at least one chemical vapor deposition chamber that can be used to deposit a capping layer, such as a plasma CVD capping layer, over the mesoporous oxide film to improve its resistance to moisture absorbtion before the substrate is transferred out of the apparatus altogether.

Turner et al. does not teach or disclose multiple deposition modules as presently claimed and thus does not anticipate new claim 64.

Edwards et al. teaches two separate deposition modules 12 and 14 that are part of a single multichamber substrate processing tool. Edwards does not teach or suggest, however, that one of the modules is a high pressure module while the other is a low pressure module as recited in claim 64. Furthermore, Edwards does not teach or suggest that one of the deposition modules include a liquid precursor deposition chamber as recited in claim 64. Accordingly, Applicants respectfully assert that claim 64 is patentable over Edwards et al.

Applicants note that the Office Action, with respect to the rejection of claims 9, 12, 14-16, 22 and 62-63, stated that Begin et al. taught high pressure deposition modules. To support this belief the Rejection referred to chambers 38, 40 and 42 which are all serviced by a single transfer chamber 14. A detailed review of Begin et al. indicates that it teaches two different deposition modules with each including a central transfer chamber (chamber 14 and chamber 72) that services the substrate processing chambers situated around the module. Begin et al. teaches that some of the substrate processing chambers situated around each central transfer chamber include vacuum pumps that control the pressure within the substrate processing chamber while others of the substrate processing chambers do not include such pumps and are therefore exposed to the same atmosphere as the substrate transfer chamber. See col. 4, lines 15-35.

With respect to the first module serviced by transfer chamber 14, Begin et al. teaches that some of each type of chamber are situated around the transfer chamber, and Begin et al. refers to these chambers as the "first plurality of chambers" (those with vacuum pumps) and the "second plurality chambers" (those without vacuum pumps). See col. 2, lines 8-27. Begin further teaches that the both types of chambers are also situated around the second module serviced by transfer chamber 72. Specifically, Begin et al. refers to these chambers as the third and fourth plurality of chambers and it states that they have functions similar to the functions of the first and second pluralities. See col. 2, lines 28-43 and col. 5, lines 31-47. Accordingly, it

can be appreciated that Begin et al. does not teach or suggest separate high pressure and low pressure processing modules as recited in claim 64 and that it does not teach or suggest a module where each chamber is dedicated to performing at least one step associated with the formation of a porous dielectric film from a liquid precursor low. Accordingly, Applicants respectfully assert that claim 64 is patentable over Begin et al.

The Rejections Under 35 U.S.C. 103(a)

Independent claim 12 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Turner et al. and further in view of Begin et al. (USP 5,310,410). Claim 12 has been canceled. Accordingly, this rejection is believed to be moot.

In place of canceled claim 12, new claim 66 has been added. New claim 66 pertains to an apparatus that includes both high pressure and low pressure deposition modules, each having a substrate transfer chamber associated therewith and a substrate handling member disposed in the respective transfer chambers. Claim 66 further requires that the apparatus include a multi-slot substrate pre-heating module coupled between the high pressure and low pressure processing modules. As recited in claim 66, the multi-slot substrate pre-heating module is accessible by both the first and second substrate handling members so that substrates can be transferred between the high and low pressure processing modules through the pre-heating module.

Applicants respectfully assert that none of the prior art references alone or in combination teach or suggest such an apparatus. Accordingly, Claim 66 is believed to be allowable over the art of record.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Paragraph beginning at line 10 of page 4 has been amended as follows:

Figure 1 illustrates a vacuum cluster tool 10 having multiple single substrate processing chambers 12 mounted on a centralized vacuum chamber, called a transfer chamber 18, for transferring substrates from a substrate cassette located in one or more loadlock **[load lock]** chambers 20, to one or more process chambers 12. This particular tool is shown to accommodate up to four (4) single substrate processing chambers 12 positioned radially about the transfer chamber. A cluster tool similar to that shown in Figure 1 is available from Applied Materials, Inc. of Santa Clara, California. The transfer of the substrates between the process chambers 12 is typically managed by a substrate handling module 16 located in a central transfer chamber 12. After the substrates are processed, they are moved back through the loadlock **[load lock]** chamber 20 and into substrate cassettes where the substrates can be moved to the next system for additional processing. Various processes, such as physical vapor deposition (PVD), chemical vapor deposition (CVD), etch, can be performed in the process chambers 12.

Paragraph beginning at line 4 of page 19 has been amended as follows:

The substrate handler 127 can enter the loadlock **[load lock]** chamber 124 at the same time as another substrate handler 112 (shown in Figure 3A) since the loadlock **[load lock]** is at atmosphere for transferring the substrates to the loadlock **[load lock]** chamber 124 from the high pressure deposition module 101. The opening in the side 128 of the transfer chamber 126 will have been closed prior to vacuum pumping of the transfer chamber 126 which is done prior to transferring the substrates into the processing chamber 130 for deposition of a capping layer.

IN THE CLAIMS:

Please amend claims 2-8, 10-11, 13-22 and 62-63; cancel claims 1, 9 and 12 and add claims 64-74 as follows.

1. CANCELED.

2. (Amended) The apparatus of claim **[1,]** 64 further comprising one or more multi-slot cooling stations disposed within the **[loadlock chamber]** transfer area.

3. (Amended) The apparatus of claim **[1,]** 64 further comprising a vacuum pump in fluid communication with the **[loadlock chamber]** transfer area.

4. (Amended) The apparatus of claim **[1,]** 64 wherein **[further comprising]** a vacuum pump is in fluid communication with each of the second plurality of **[processing region in the one or more processing]** chambers.

5. (Amended) The apparatus of claim **[1,]** 64 wherein each of the second plurality of **[processing]** chambers has two isolated processing regions.

6. (Amended) The apparatus of claim **[1,]** 5 wherein each isolated processing region includes a gas distribution assembly disposed therein and each gas distribution assembly shares process gases from one or more gas sources.

7. (Amended) The apparatus of claim **[1,]** 5 further comprising a remote plasma system having an RF generator connected to each individual processing region.

8. (Amended) The apparatus of claim **[1,]** 5 wherein a remote plasma system is in fluid communication with each individual processing region.

9. CANCELED.

10. (Amended) The apparatus of claim **[9,]** 64 wherein the high pressure **[deposition]** processing module **[is a spin-on dielectric module comprising one or more]** comprises at least one substrate stripping chambers.

11. (Amended) The apparatus of claim **[1,]** 64 wherein the **[one or more multi-slot pre-heating modules are disposed within the]** transfer area comprises a loadlock chamber.

12. CANCELED.

13. (Amended) The apparatus of claim **[12,]** 66 wherein the high pressure **[deposition]** processing module comprises:

(a) one or more substrate spinner chambers;

(b) one or more substrate curing chambers;

(c) one or more substrate stripping chambers; and

(d) one or more silylation deposition chambers**[; and**

(e) a second substrate handling member disposed in the high pressure deposition module].

14. (Amended) The apparatus of claim **[12,]** 67 further comprising one or more multi-slot cooling stations disposed within **[each of the one or more]** the second loadlock chamber**[s]**.

15. (Amended) The apparatus of claim **[12,]** 66 further comprising a vacuum pump in fluid communication with the multi-slot pre-heating module **[one or more loadlock chambers]**.

16. (Amended) The apparatus of claim **[12,]** 66 wherein **[further comprising]** a vacuum pump is in fluid communication with each of the second plurality of chambers **[processing region]**.

17. (Amended) The apparatus of claim **[12,]** 16 wherein each of the second plurality of **[processing]** chambers has two isolated processing regions.

18. (Amended) The apparatus of claim **[12,]** 17 wherein each isolated processing region includes a gas distribution assembly disposed therein and each gas distribution assembly shares process gases from one or more gas sources.

19. (Twice Amended) The apparatus of claim **[12,]** 17 further comprising a remote plasma system having a RF generator connected to each isolated processing region.

20. (Amended) The apparatus of claim **[19,]** 13 wherein each substrate stripping chamber is an oxidation chamber.

21. (Twice Amended) The apparatus of claim 20**[,]** wherein **[the]** each oxidation chamber is connected to a remote plasma system having a RF generator or a microwave generator.

22. (Amended) The apparatus of claim **[12,]** 66 wherein the multi-slot pre-heating module is disposed within **[the]** a second loadlock chamber.

23-61. PREVIOUSLY CANCELED - RESTRICTION REQUIREMENT.

62. (Amended) The apparatus of claim **[9]** 64 wherein **[the]** an isolated processing region of each of said **[processing]** second plurality of chambers and an interior region of said high pressure deposition module are isolatable from an exterior environment in which said apparatus is situated.

63. (Amended) The apparatus of claim **[12]** 66 wherein **[the]** an isolated processing region of each of said **[processing]** second plurality of chambers and an interior region of said high pressure deposition module are isolatable from an exterior environment in which said apparatus is situated.

--64. (New) An apparatus for processing substrates, the apparatus comprising:

a high pressure processing module including a first plurality substrate processing chambers, a first transfer chamber that enables access to each of the first plurality of substrate processing chambers, and a first substrate handling member disposed in the first transfer chamber and configured to transfer substrates into and out of any of said first plurality of substrate processing chambers; wherein each of the first plurality of substrate processing chambers is dedicated to perform at least one step associated with the formation of a porous dielectric film from a liquid precursor including at least one liquid precursor deposition chamber;

a low pressure processing module including a second plurality substrate processing chambers, a second transfer chamber that enables access to each of the second plurality of substrate processing chambers, and a second substrate handling member disposed in the second transfer chamber and configured to transfer substrates into and out of any of said second plurality of substrate processing chambers; wherein the second plurality of substrate processing chambers includes at least one chemical vapor deposition chamber;

a loadlock chamber operatively coupled to the low pressure processing module to enable transfer of substrates between the apparatus and a clean room; and

a transfer area that enables substrates to be transferred between the high pressure processing module and the low pressure processing module.

65. (New) The apparatus of claim 64 wherein the at least on liquid precursor deposition chamber comprises a spin-on deposition chamber.

66. (New) An apparatus for processing substrates, the apparatus comprising:

a high pressure processing module including a first plurality substrate processing chambers, a first transfer chamber that enables access to each of the first plurality of substrate processing chambers, and a first substrate handling member disposed in the first transfer chamber and configured to transfer substrates into and out of any of said first plurality of substrate processing chambers;

a low pressure processing module including a second plurality substrate processing chambers, a second transfer chamber that enables access to each of the second plurality of substrate processing chambers, and a second substrate handling member disposed in the second transfer chamber and configured to transfer substrates into and out of any of said second plurality of substrate processing chambers;

a loadlock chamber operatively coupled to the high pressure processing module to enable transfer of substrates between the apparatus and a clean room; and

a multi-slot substrate pre-heating module coupled between the high pressure and low pressure processing modules, the multi-slot substrate pre-heating module being accessible by both the first and second substrate handling members.

67. (New) The apparatus of claim 66 wherein the multi-slot substrate pre-heating module is part of a second loadlock chamber.

68. (New) The apparatus of claim 66 wherein the multi-slot substrate pre-heating module comprises:

a housing including an opening;

a first compartment capable of supporting a first plurality of substrates, the first compartment being operatively coupled to a first moveable shaft; and

a substrate transfer region where substrates can be transferred into or out of the first compartment of the pre-heating module through the opening in the housing;

wherein the first compartment is moveable within the housing to expose an interior section of the compartment to the opening.

69. (New) The apparatus of claim 68 wherein the first compartment is moveable between a substrate loading/unloading position that exposes an interior section of the

first compartment to the opening and an isolation position where the compartment is isolated from the atmosphere in the substrate transfer region.

70. (New) The apparatus of claim 69 wherein the multi-slot substrate pre-heating module further comprises first and second sealing flanges disposed peripherally within and extending inward from the housing and wherein the first compartment comprises a bottom platform, a top platform and a support that supports the platforms in a spaced relationship and wherein when the first compartment is in the isolation position the top platform engages the first sealing flange and the bottom platform engages the second sealing flange.

71. (New) The apparatus of claim 69 wherein the multi-slot substrate pre-heating module further comprises a second compartment capable of supporting a second plurality of substrates, the second compartment being operatively coupled to a second moveable shaft so that it is moveable within the housing to expose an interior section of the compartment to the opening.

72. (New) The apparatus of claim 71 wherein the second compartment is moveable between a substrate loading/unloading position that exposes an interior section of the second compartment to the opening and an isolation position where the second compartment is isolated from the atmosphere in the substrate transfer region.

73. (New) The apparatus of claim 72 wherein the multi-slot substrate pre-heating module further comprises first, second, third and fourth sealing flanges disposed peripherally within and extending inward from the housing;

wherein the first compartment comprises a first bottom platform, a first top platform and a first support that supports the platforms in a spaced relationship and wherein when the first compartment is in the isolation position the first top platform engages the first sealing flange and the first bottom platform engages the second sealing flange; and

wherein the second compartment comprises a second bottom platform, a second top platform and a second support that supports the platforms in a spaced relationship and wherein when the second compartment is in the isolation position the second top platform engages the third sealing flange and the second bottom platform engages the fourth sealing flange.

74. (New) The apparatus of claim 71 wherein, when each of the first and second compartments are positioned in the isolation position, the compartments are spaced apart from each other in a vertical relationship and the transfer region is located between the compartments.--